Claims

1. An isolated stem cell population wherein said stem cells are $CD34^+$, capable of self regeneration, capable of differentiation into ectodermal, mesodermal and endodermal cells and capable of adhering to tissue-culture grade plastic.

2. The cell population according to claim 1 further characterised by the ability of the cells to adhere to tissue-culture grade plastic within 3 hours after isolation, and to remain adherent for at least 72 hours.

3. The stem cell population according to claim 1 or claim 2 wherein the cells are $CD33^-$, $CD38^-$, $HLA\text{-}DR^-$, $CD3^-$ and $CD19^-$.

4. The stem cell population according to any preceding claim which is enriched for cells which are also $Thy\text{-}1^+$.

5. The stem cell population according to any preceding claim which is enriched for cells which are also $AC133^+$ and/or $c\text{-}met^+$.

6. The stem cell population according to any preceding claim that expresses genes encoding Rex-1, Oct 4, Nanog, CD34, CD133, PECAM, VWF, Tal-1, CXCR4, Angiopoietin 1, Tie 2, TNNT1, Desmin, Nebulin, Connexin-43, GATA-4, VEGF, KDR, Angiopoietin 2, ICAM-2, VE cadherin, Alpha-1-antitrypsin, Cytokeratin 18, Nestin, Vimentin and c-met.

7. The stem cell population according to any preceding claim whose progeny produced after culturing express genes encoding CD133, PECAM, VWF, Tal-1, CXCR4, Angiopoietin-1, Nebulin, Troponin 1, VEGF, Angiopoietin 2, ICAM 2, Alpha-1-antitrypsin, Cytokeratin 18, LDLR,

Albumin, HGF, HNF-3β, transferrin, Alphafeto protein, Pax-6, Pdx=1, Insulin, IGF-1, NeuroD-1 and NGN3

8. The stem cell population according to any preceding claim whose progeny express genes involved in insulin production.

9. The stem cell population according to any one of claims 1-8 wherein the stem cells are adult stem cells.

10. The stem cell population according to any one of claims 1-8 wherein the stem cell population comprises fetal cells obtained from a non-fetal sample such as an umbilical cord sample.

11. The stem cell population according to any preceding claim wherein the cells have the characteristics of those deposited with ECACC under accession No. 04092401.

12. The stem cell population according to any preceding claim which is mammalian in origin.

13. The stem cell population according to any preceding claim which is human in origin.

14. The stem cell population according to any one of claims 1-12 which is murine, equine or bovine in origin.

15. The stem cell population according to any one of claims 1-12 which is isolated or derived from a sample taken from a companion animal.

16. The stem cell population according to any preceding claim which does not require feeder layers during culturing thereof.

17. An isolated stem cell population capable of self regeneration and differentiation into ectodermal, mesodermal and endodermal cells, said population obtainable by:

(i) subjecting haemopoietic tissue to density gradient separation;
(ii) exposing low density cells to an affinity ligand for CD34;
(iii) recovering cells attached to said CD34 ligand;
(iv) exposing the CD34+ subpopulation to tissue culture grade plastic; and
(v) recovering $CD34^+$ cells adherent to said plastic.

18. A culture comprising:

(i) a stem cell population wherein said stem cells are $CD34^+$, capable of adhering to tissue-culture grade plastic, capable of self regeneration and capable of differentiation into ectodermal, mesodermal and endodermal cells; and
(ii) a medium capable of supporting the growth of said stem cells.

19. A method of isolating a stem cell population wherein said stem cells are $CD34^+$, capable of adhering to tissue-culture grade plastic, capable of self regeneration and capable of differentiation into ectodermal, mesodermal and endodermal cells, which method comprises taking a sample of blood or bone marrow from a subject and extracting said cell population therefrom.

20. A method of isolation as claimed in claim 19 which comprises:

(i) subjecting haemopoietic tissue to density gradient separation;
(ii) exposing low density cells to an affinity ligand for CD34;

(iii) recovering cells attached to said CD34 ligand;
(iv) exposing the CD34+ subpopulation to a solid support;
(v) recovering $CD34^+$ cells adherent to said solid support.

21. A method according to claim 20 wherein the solid support is selected from tissue-culture grade plastic or glass.

22. A method as claimed in claim 19 or 20 which further comprises a step of culturing said isolated population of stem cells.

23. A method of producing a population of target cells which comprises culturing a stem cell population as defined in any of claims 1 to 17 with a plurality of growth factors which causes differentiation of said stem cell population.

24. A method as claimed in claim 23 wherein the target cell is selected from the group comprising liver, pancreatic, haemopoietic, neuronal and oligodendrocytic cells.

25. A method of culturing a stem cell population as defined in any one of claims 1 to 17 which comprises contacting said population with a plurality of growth factors which promote and/or sustain proliferation of said stem cell population.

26. A cell population produced by a method as claimed in any one of claims 19 to 25.

27. A cell population as claimed in any one of claims 1-17 and 26 wherein the cell is capable of surviving cryopreservation.

28. A cell population as claimed in any one of claims 1 to 17, 26 or 27 wherein the genome has been altered by insertion of a region of nucleic acid.

29. The cell population of claim 28 wherein the genome is altered by insertion of DNA using a DNA virus, RNA virus or a retroviral vector.

30. A cell population as claimed in any one of claims 1 to 17, 26 or 27 wherein a portion of the genome has been inactivated, e.g. through the presence of an antisense nucleic acid molecule, a ribozyme sequence or an inhibitory RNA sequence.

31. A cell population as claimed in any one of claims 1 to 17 or 26 to 30 for use in therapy.

32. A cell population as claimed in any one of claims 1 to 17 or 26 to 30 for use in regenerating an organ or repairing a damaged organ.

33. A method of regenerating an organ or repairing a damaged organ of a patient which comprises administering to said patient cells according to any one of claims 1 to 17 or 26 to 30.

34. A cell population or method according to claim 32 or claim 33 wherein the organ is selected from the group comprising the haemopoietic or immune system, liver, lung, pancreas, bone, cartilage, muscle, skin, brain or nervour system and heart or circulatory system.

35. A cell population or method according to any one of claims 32 to 34 wherein the cells are labelled with a traceable marker, preferably iron oxide or paramagnetic beads.

36. A method of cell transplantation which comprises introducing into a subject a cell population as claimed in any one of claims 1 to 17 or 26 to 30.

37. A method of screening an agent for its organo-specific effects by exposing the cells produced by a method as claimed in claim 23 or 24 to said agent.

38. A method according to claim 37 wherein the agent is a toxin suspected of organo-specific toxicity.

39. A method according to claim 37 wherein the agent is a drug or therapeutic suspected of organo-specific toxicity.

40. A method according to claim 37 where the agent is a drug or therapeutic agent suspected of beneficial organo-specific effects.

41. An *in vitro* method of protein production which comprises culturing the stem cells of any one of claims 1 to 17 or a differentiated cell line derived therefrom and recovering one or more of the proteins expressed by said cells.